



# Healthcare Costs for 17 Chronic Conditions in Ontario

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# Overview

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- Implications & Next Steps

# Research Team

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# Background

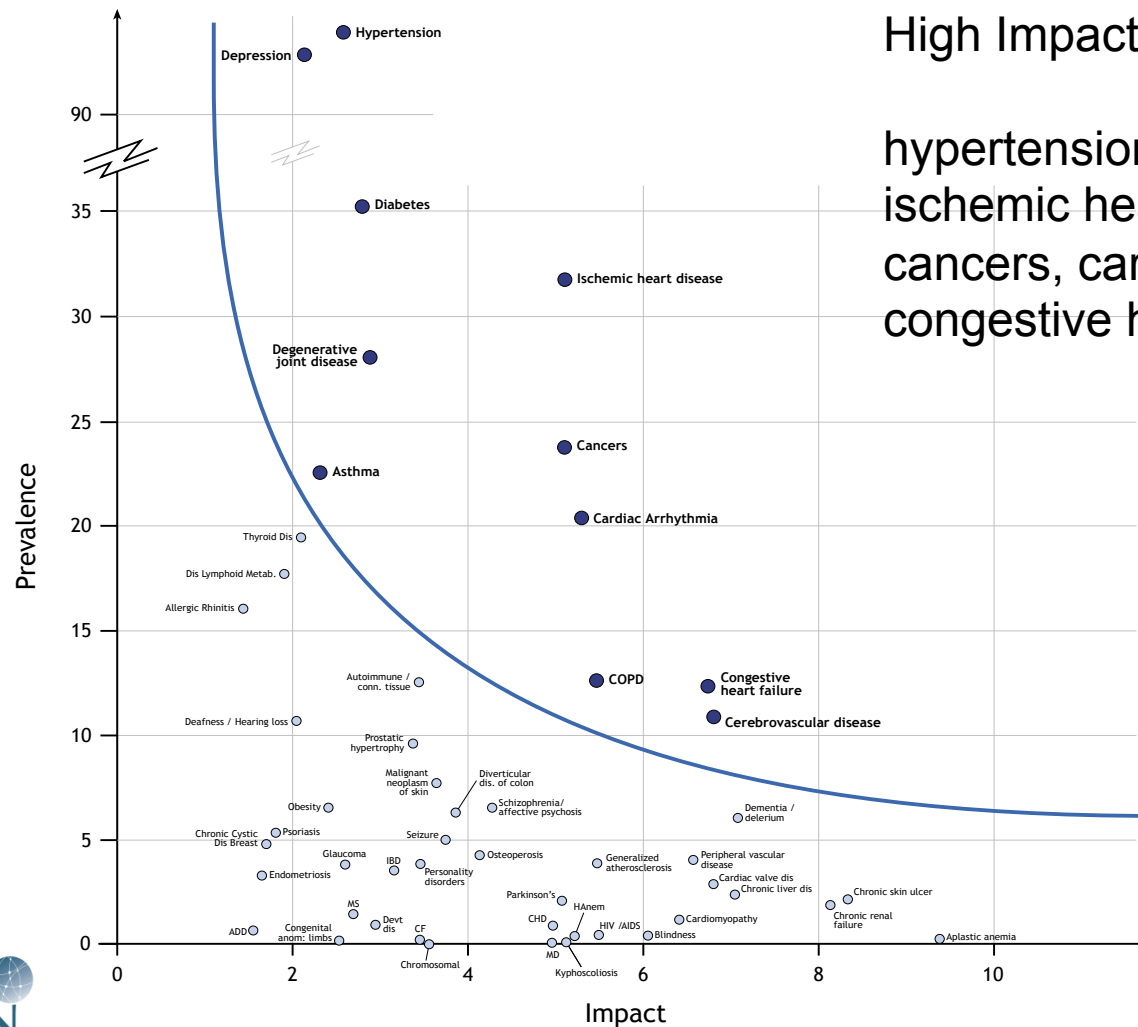
- The high and growing cost burden of chronic conditions is a highly cited feature of most western countries.
- There is an increasing appreciation of the magnitude of costs associated with caring for individuals with common chronic conditions.
- However, estimates to date were derived for specific conditions with varied methods precluding direct comparison of costs.

# Background

- ...or, in the nearest approximation to the ideal, estimates of burden were based on Ambulatory Care Group (ACG<sup>®</sup>) weights
- See: Broemeling, Watson, Black. Chronic conditions and co-morbidity among residents of British Columbia. Centre for Health Services and Policy Research. 2005

# Background

Figure 4: High impact and/or high prevalence chronic conditions



High Impact/Prevalence:

hypertension, depression, diabetes, ischemic heart disease, asthma, cancers, cardiac arrhythmia, COPD, congestive heart failure, stroke

# Purpose

- The objective of the present study was to estimate the annual incremental costs associated with 17 common chronic conditions using a common methodology to measure the comparative costs associated with each condition.

# Methods: Data Sources

Ontario has rich health administrative data held at the Institute for Clinical Evaluative Sciences (ICES) that are linkable at the individual level using coded identifiers:

- Hospital Data from Canadian Institute for Health Information (CIHI) Discharge Abstract Database, National Rehabilitation Reporting System, Continuing Care Reporting System, Mental Health Reporting System, Ambulatory Care Reporting System
- Physician, pharmaceutical and home care billing databases maintained in Ontario
- Also hospital cost databases from the Management Information System (MIS)



# Methods: Population

- Cross sectional 20% sample of Ontario residents aged 0-105 as of the index date of the study (April 1, 2012) diagnosed with one of the following 17 conditions:

Cardiac arrhythmia

Acute myocardial infarction

Hypertension

Chronic coronary syndrome

Congestive heart failure

Stroke

Asthma

Chronic obstructive pulmonary disorder

Osteoporosis

Rheumatoid arthritis

Osteo- and other arthritis

Mood disorders

Dementia

Other mental health

Cancer

Diabetes

Renal failure

# Methods: Population

- Validated ICES derived chronic disease databases were used to identify prevalent cases of:
  - Hypertension,
  - Congestive Heart Failure,
  - Asthma,
  - Chronic Obstructive Pulmonary Disorder,
  - Diabetes,
  - Acute Myocardial Infarction (April 2011 to March 2012)

# Methods: Population

All other diagnoses:

- One acute care code in an acute care episode (Canadian Institute for Health Information Discharge Abstract Database, CIHI-DAD),
- OR 2 relevant ICD9 codes in OHIP physician billing records

... within 2 years prior to the index date (April 1, 2012)

This is generally the approach of the ICES derived databases.

For details, see: Koné Pefoyo AJ, Bronskill SE, Gruneir A, Calzavara A, Thavorn K, Petrosyan Y, Maxwell CJ, Bai Y, Wodchis WP. The increasing burden and complexity of multimorbidity. BMC Public Health. 2015 Apr 23;15(1):415.,

# Methods: Cost Estimation

Individual patient-specific total direct cost estimation based on methods developed for use with administrative data:

- Mostly bottom-up with some top-down algorithms to determine encounter-specific costs.
- Generally = Sum over one year of all Use x Cost/Use  
(all encounters, not those specific to one condition)
- Utilization includes all hospital, home care, long term care, physician, pharmacy for 65+ and all receiving provincial government income support payments

# Methods: Cost Estimation cont'd

- Encounter-specific costs equal to amounts paid for physician, drugs, home care (plus allocated case-management)
- Hospital costs allocated to cost per weighted case (using CIHI Resource Intensity Weights) from hospital financial submissions using Management Information System (MIS) and related sources from Ontario Ministry of Health and Long Term Care (MOHLTC) Health Data Branch,
- Other costs from MOHLTC (e.g. OHIP Architected Payment Database)

For details, see: Wodchis WP, Bushmeneva K, Nikitovic M, McKillop I. Guidelines on Person-Level Costing Using Administrative Databases in Ontario. Working Paper Series. Vol 1. Toronto: Health System Performance Research Network; 2013.

# Methods: Cost Estimation cont'd

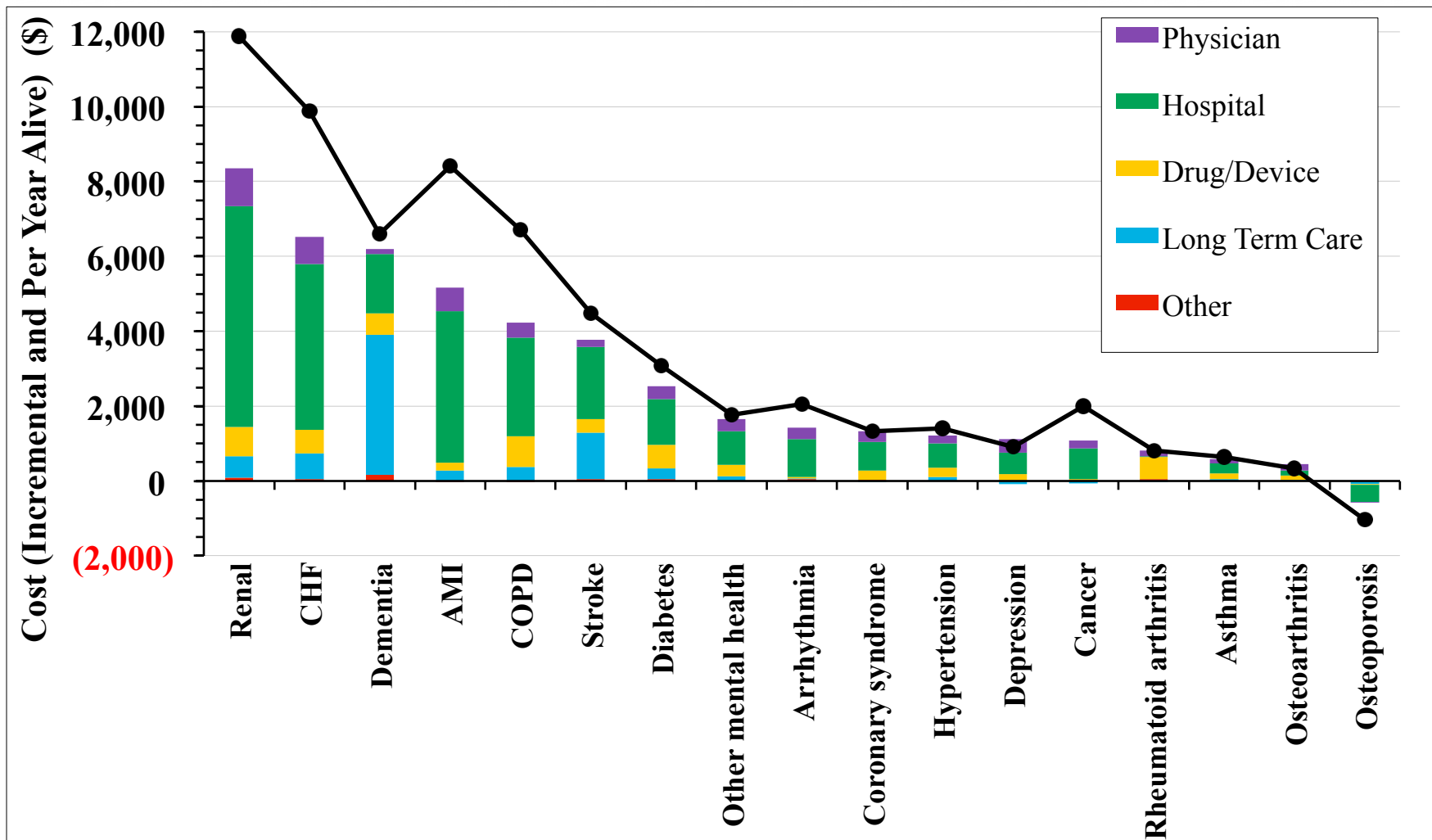
For each condition:

- Find person in Ontario population without condition but matched on : Age +/- 3 months, Sex, LTC residence
- Then propensity match on age, sex, LTC, rurality, 12 Collapsed ADG scores, neighborhood income quintile, 14 provincial regions (caliper of 0.2 s.d. of propensity score)
- Match within 20% sample of residents except for Arthritis, Hypertension and Asthma where we use entire population to find matches (large number of unmatched in 20% sample).
- Incremental cost = difference cost w/ vs w/o condition
- Provincial total cost = population x incremental cost

# Results: Study Population

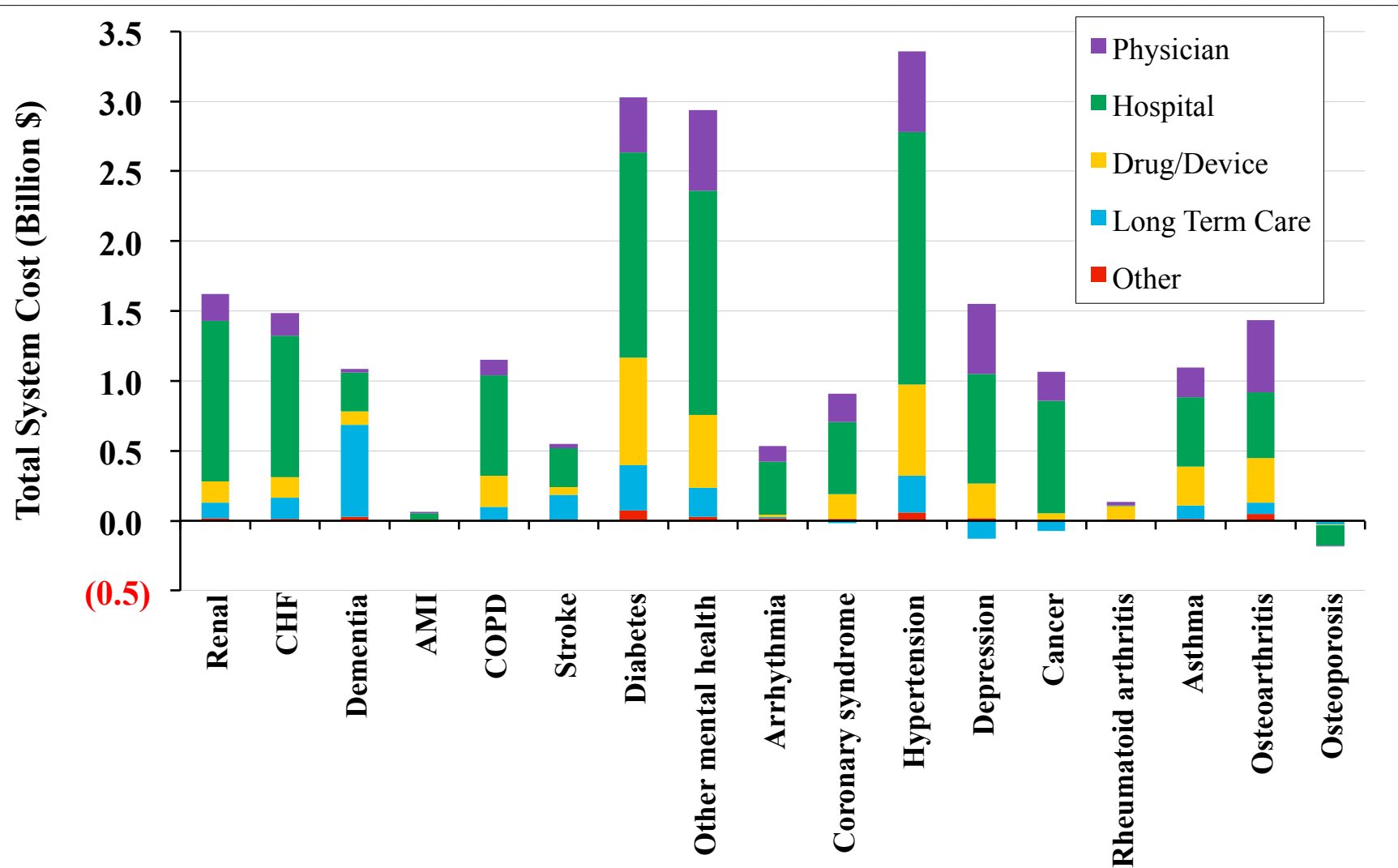
	ON Population	Study 20% Sample
Cardiac arrhythmia	375,946	75,223
Acute myocardial infarction	11,994	2,430
Hypertension	2,755,432	551,899
Chronic coronary syndrome	684,762	137,071
Congestive heart failure	228,084	45,691
Stroke	145,156	28,758
Asthma	1,902,121	380,953
Chronic obstructive pulmonary disorder	272,186	54,732
Osteoporosis	324,166	64,436
Rheumatoid arthritis	163,151	32,934
Osteo- and other arthritis	3,186,543	637,718
Mood disorders	1,388,188	278,103
Dementia	175,082	35,300
Other mental health	1,775,706	355,454
Cancer	981,778	196,146
Diabetes	1,199,808	240,005
Renal failure	194,674	38,907

# Results: Incremental Cost per year

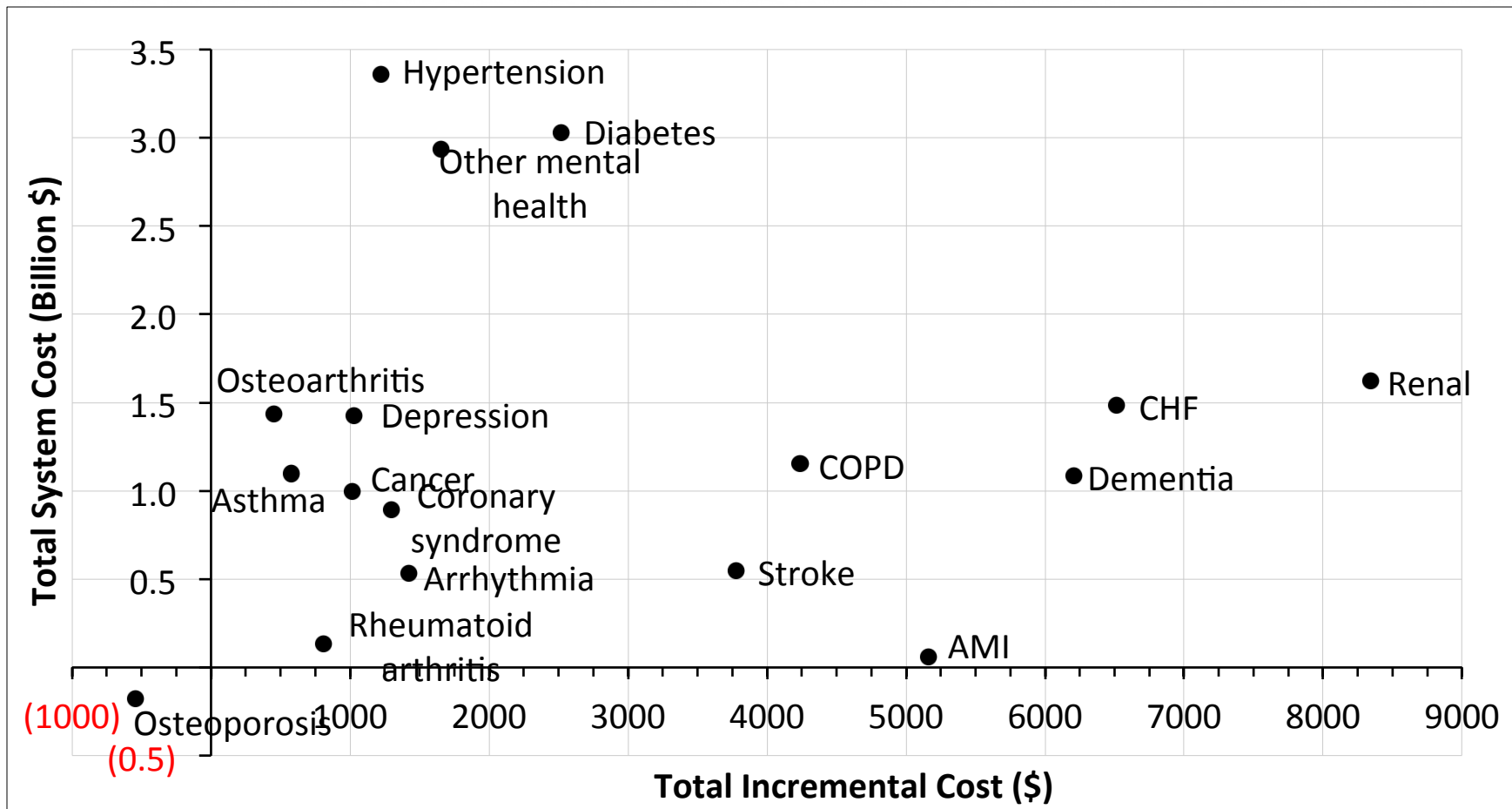




# Results: Total Direct Cost per year



# Results: Incremental vs Total Costs



# Strengths and Limitations

- Study population and costs representative of Ontario population (> 95% sample matched).
- Robust incremental cost estimates.
- Conditions are those present at start of year and do not include new incident cases so cannot say “annual cost for all diabetes care”.
- Some conditions are episodic and episode-based costs may be more appropriate (AMI, cancer)

# Implications and Next Steps

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- We want to understand how quality relates to costs. Do people who get better care have lower costs? Over what time horizon? (some early evidence for diabetes)
- We have examined multimorbidity as incremental number of conditions but some clusters might have particularly important cost implications.